CREATOR

VOLUME 16 NUMBER 4

"THE FACE OF GOD"

"But," He said, "you cannot see My face, for no one may see Me and live" (Exodus 33:20).

It is very difficult for me to begin writing today. God is Spirit (John 4:24), and He doesn't have a face like you and I. Any attempt to explain the burning gaze of our Heavenly Father's eyes is going to fall short of His perfections. My feeble efforts to create a portrait of His essential being are like a young child drawing a picture of his dad using paper and crayons.

Author as drawn by eldest son

I would, however, like to explore the character of our awesome Creator by examining *nuclear fission* and discover how it gives us a glimmer of His great power. Before discussing nuclear fission, which is a subject of much scientific import these days, let us first consider God's justice.

Many who trust in Christ to forgive their sins want to focus *only* on the mercy of God. They rightly see the image of Jesus dying on the Cross painted in the Gospels with all His love, sacrifice, compassion, and long-suffering. But this is an incomplete view of God. Jesus taught us that we *must* worship His Father in Spirit and *Truth*—full Truth (John 4:22-24). Thus an imbalanced understanding of God leads to false worship! And true worship *starts* with properly fearing Him (Proverbs 9:10).

Our Lord is a God of justice, as well as mercy, and the Cross demonstrates how God hates our wickedness. Like His Father, Jesus cannot tolerate our sin (Revelation 6:16). And everyone has sinned. Christ died on a cross to heal His own of the wrongdoing that separates us from God. It is not that Christ or His Father takes pleasure in punishing anyone (Ezekiel 33:11)—*by no means*—but as God, He *must* administer justice (Isaiah 5:16; Revelation 19:11) because *He is just*. This has been and always will be His character forever. Amen!

NUCLEAR FISSION

"Is not My word like fire," declares the LORD, "and like a hammer that breaks a rock in pieces?" (Jeremiah 23:29).

An "atom is a body which cannot be cut in two,"[1] or so goes the definition of an atom in 1878. But the atom is much more complicated than was first realized 130 years ago, and it can, in fact, be divided. The word *fission* comes from the Latin word, *fissio*, which means "to cleave or split." When scientists speak of *nuclear fission*, they are referring to the *splitting* of the *nucleus* of an atom.

All matter in the universe is made up of atoms. Each atom consists of a core, or nucleus, which is composed of protons and neutrons (NEW - trons), and a "cloud" of electrons surrounding the nucleus. The size of an atom is defined, not by its nucleus, but by the shell of electrons it possesses, much like the dimensions of the solar system are determined, not by the size of the Sun, but by the orbits of Pluto and Neptune. (The orbit of the electrons in uranium is 23,000 times bigger than the diameter of the atom's nucleus.)

Most of an atom's potential energy, on the other hand, rests in its nucleus and is of a magnitude far beyond what we experience in everyday life. The energy released in splitting uranium atoms is *50 million times greater* than that produced when wood is burned (combustion of carbon atoms). Here's another way of looking at this: for a nuclear-powered submarine, the energy obtained from a piece of uranium about *the size of a golf ball* equals the energy that can be obtained from one million gallons of gasoline!

There are 92 different kinds of elements that Christ Jesus has designed. Hydrogen and helium are elements; so are carbon, iron, lead, mercury, silver, and gold. But none of these can be divided to produce nuclear energy. Only the most massive atoms, like uranium or plutonium, will allow a tiny portion of their nucleus to be converted into energy (about 0.1% of the total nuclear mass).

In 1938, Otto Hahn, Lise Meitner, and Fritz Strassmann became the first scientists to split uranium atoms in two. How did they do it? After all, it's one thing to break a large rock using a hammer, and quite another to divide the uranium nucleus, which is only 600 billionths of an inch in diameter (40 billion uranium nuclei lined up in a row equals one centimeter)! It turns out that the "hammers" that Hahn, Meitner, and Strassmann used were neutrons, tiny particles released from the nucleus of the radioactive element beryllium. (Think of the neutrons emitted from beryllium as sparks given off by a sparkler.)

We could picture a uranium nucleus—with its 235 protons and neutrons—as a very tall, unsteady stack of books. Place just one more book on the already teetering tower, and it comes

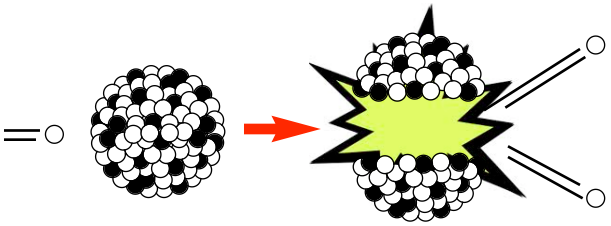
Nuclear Energy

We can calculate how much energy a nuclear reactor or an atomic bomb will produce by using the formula $\mathbf{E=mc^2}$. It was first postulated by Albert Einstein 100 years ago. **E** stands for energy, **m** for mass, and **c** is the velocity of light, which is 670 million miles per hour or 300 million meters per second. Although the mass of a uranium nucleus converted into energy during a fission reaction is extremely small, the velocity of light multiplied by itself is unbelievably large. Thus, using Einstein's equation, we can see that the amount of energy released from nuclear fission can be exceedingly great!

1 *The Encyclopaedia Britannica, Ninth Edition, Volume III*, (Charles Scribner's Sons: New York, 1878), p. 36.

tumbling down. The centers of big atoms are also quite unstable. Add a neutron to a uranium nucleus and it breaks (fissions) in two, releasing enormous energy and freeing some of its own neutrons. These released neutrons cause other uranium atoms to split, creating a chain reaction.

After years of intense laboratory research, it was discovered, in the early years of the World War II, that dividing large numbers of uranium atoms could be done in a controlled fashion. In 1942, Enrico Fermi and a group of



Fission of a uranium atom

his colleagues built the first nuclear reactor under the abandoned west stands of Stagg Field at the University of Chicago. This set the stage for an enormous amount of energy that could be harnessed relatively safely.

Fermi was able to start a *controlled chain reaction* in his make-shift reactor. One uranium atom would divide with the release of, say, two neutrons. These two neutrons would cause two other uranium atoms to split, with the liberation of a total of four neutrons. These four neutrons would cause four uranium atoms to split, with the release of eight neutrons, and so forth, all within a tiny fraction of a second.

This is the principle behind atomic energy. The basic difference between a nuclear power plant and an atom bomb is a matter of control. In a nuclear power plant, metal rods made of cadmium or boron are inserted into uranium or plutonium fuel to absorb extra neutrons and thus dampen the chain reaction. An A-bomb has no such safety mechanisms. The detonation of an atomic bomb results in the rapid splitting of trillions upon trillions of atoms *all at once* with the release of immense energy in the form of an explosion. The atomic bomb, however, was not easy to make.

TRINITY

The secret things belong to the LORD our God . . . (Deuteronomy 29:29).

For events to go from Hahn, Meitner, and Strassmann splitting the atom in 1938 to the detonation of an A-bomb seven years later, a huge undertaking was necessary, costing two billion dollars and thousands of man-hours. Eventually, on the morning of July 16, 1945, the first atomic bomb was detonated in the Jornada del Muerto (Journey of Death) desert near Alamogordo, New Mexico, in a test code-named "Trinity." The amount of plutonium in the Trinity device came to just under 14 pounds (six kilograms) and was roughly the size of a small orange. The atomic explosion briefly heated the surrounding air to a staggering 20 million degrees —a temperature equal to the inside of the Sun. It also produced pressures greater than those at the center of the earth! The Trinity bomb was so powerful that it instantly vaporized the 100-foot steel tower upon which it was sitting. The tower wasn't blown apart—*it just simply disappeared!* Eyewitness to the blast, Brigadier General Thomas F. Farrell wrote, "[it] made us feel that we puny things were blasphemous to dare tamper with the forces heretofore reserved to the Almighty."[2]

The chain reaction of plutonium atoms in the Trinity explosion was so fast that it took only four millionths of a second to complete. The power of this first nuclear explosion was estimated to be equivalent to 21,000 tons (21 kilotons) of TNT. Scientists had succeeded in

2 War Department Release on New Mexico Test, July 16, 1945.

Trinity nuclear explosion

tapping into a secret energy that God had created in the beginning of time. This incredible energy of nuclear weapons comes from the hand of the Lord Jesus Christ, our Creator. It is thus a pale reflection of His power (Job 26:14)!

HIROSHIMA

Be merciful to me, LORD, for I am faint;
O LORD, heal me, for my bones are in agony.
My soul is in anguish (Psalm 6:2-3a).

I am disturbed by photos of a foreign city I have seen in books, and am struck by how they reflect the terrifying power of our Heavenly Father. The mental images I have right now are of World War II—specifically Hiroshima, the first city ever destroyed by an atomic explosion.

In an attempt to end the war with Japan, the United States dropped a 12.5 kiloton uranium bomb on the Japanese city of Hiroshima on Monday, August 6, 1945 at 8:16 a.m. It was detonated 1,900 feet above the heart of the city. "The blast wave, rocketing several hundred yards from the hypocenter at 2 miles per second and then slowing to the speed of sound . . . threw up a vast cloud of smoke and dust."[3] The center of the city was completely demolished. Incredible destruction and injury occurred up to 2.5 miles from the blast. All told, over 100,000 Japanese people died from the dropping of that one bomb, which contained only 33 pounds (15 kilograms) of uranium—about the size of a cantaloupe.

I can't, for the sake of the children reading this account, detail the horrible conditions of the living and dead shortly after the Hiroshima bombing. I am convinced, in spite of my medical training, that I would not have been able to bear, firsthand, the images of suffering that so many survivors were forced to see. Below are just two of the least-graphic testimonials of the hibakusha (atomic bomb survivors):

"Ah, that instant! I felt as though I had been struck on the back with something like a big hammer, and thrown into boiling oil . . ."[4]

a junior-college girl

"A streetcar was all burned and just the skeleton of it was left . . . When I saw that I shuddered all over and started to tremble."[5]

a first-grade girl

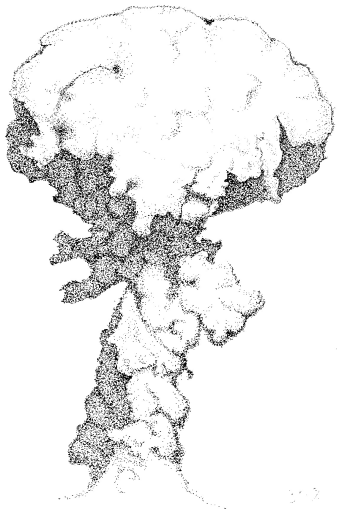
Earlier today, tears welled up in my eyes as I thought about the people who died in the Hiroshima blast. My grief then turned to all men, women, and children who will someday soon have to face our holy Heavenly Father without Jesus at their side, for isn't His Father greater than any weapon man can wield?

I do not want to leave you with the impression that the Japanese people who suffered and died in Hiroshima and Nagasaki were any more sinful than the rest of us. We all deserve the same fate. The Lord God deeply cares for the Japanese people, then and now, as much as He cares for all mankind (Psalm 145:9)!

The atomic bomb provides us, however, with a pale reflection of God's face, and the two Japanese cities that were decimated by its untamed

3 Rhodes, Richard, *The Making of the Atomic Bomb*, (Simon & Schuster, Inc.: New York, 1986) pp. 717.

4, 5 Rhodes, Richard, *The Making of the Atomic Bomb*, (Simon & Schuster, Inc.: New York, 1986) pp. 716, 722.



Hiroshima atomic explosion

power show us how it will be for those who stand unprotected before God in full view of His glory.

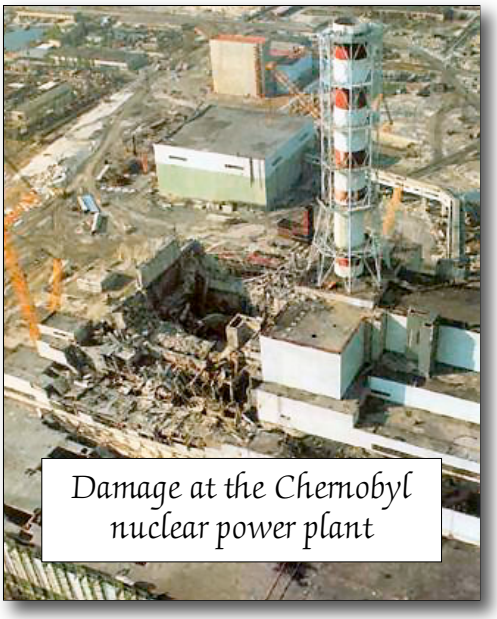
CHERNOBYL & FUKUSHIMA

Do not be a terror to me; You are my refuge in the day of disaster (Jeremiah 17:17).

Nuclear power plants use the heat energy produced by the controlled fission of uranium or plutonium to turn water into steam. The steam generated is applied to power turbines, which in turn produce electricity via generators. Special rods that absorb neutrons are inserted into the uranium or plutonium fuel to control the speed at which the fuel is fissioned (that is, the rate at which atoms of uranium or plutonium are split in a chain reaction manner). Water is also used to keep the core of the nuclear reactor (where the nuclear fuel is kept) from overheating.

Now, have you ever heard someone say, "Don't put God in a box"? In essence, to "put God in a box" is to limit who He is in our minds. Instead of seeing our Heavenly Father as the wonderful, holy, almighty, sovereign God He is, we see Him somewhat smaller and much less powerful. We are all guilty of this sin! We create this "little god" in our minds because we are uncomfortable with God being the infinitely sovereign Ruler of the universe. The result is that we commit idolatry—we end up worshipping a god different from the true God of the Bible. And if we try to control our image of God in this way, we endanger ourselves and others! We distort in our hearts His rightful authority to work in us.

Some may disagree, but I believe man's attempt to control nuclear fission is an apt analogy to the above. Fission is one of the greatest sources of energy found on Earth. For its part, nuclear fission has been "kind" to us, allowing many governments to tap into its abundant energy resources to power their cities. But trying to "put nuclear energy in a box" carries with it risks—risks that have become all too real at the Chernobyl and Fukushima nuclear power plants. Trying to harness nuclear energy is a bit like attempting to bridle God. It is fraught with danger!



Damage at the Chernobyl nuclear power plant

THE CHOICES

. . . in Righteousness I will see Your face; . . . I will be satisfied with seeing Your likeness (Psalm 17:15).

At the time of Your appearing You will make [Your enemies] like a fiery furnace (Psalm 21:9a).

Radioactivity—few words in any language evoke more anxiety. People working in nuclear power plants take extreme caution to protect themselves from radiation. Special clothing and head gear, radiation badges indicating exposure, medications to limit radiation damage, and lead- or water-lined walls, to name a few, are all ways to protect personnel.

This great thing called nuclear energy is a mere spark of God's infinite power and glory (Job 26:14). Our Lord's face radiates with unimaginable beauty (Psalm 27:4) . . . and terror (Exodus 15:13-18). Our God is so merciful, patient, good, and slow to anger. He is also just, righteous, and holy. And, apart from His Son, our Lord Jesus Christ, we would be unable to bear His presence. The only safe place is *in Christ*.

If atomic energy is a shadow of God's just power, how can we offer shielding to folks who don't know Him? This much is certain—those who choose to come before Him, naked in their sin and with no protection, will suffer eternal disaster (Psalm 21:9). But those clothed in the righteousness of Jesus will experience the unspeakable joy of His dazzling appearance *without harm* (Psalm 17:15), perfectly safe in Christ. What would it be like to sit on top of an atomic bomb when it went off and be untouched by its searing heat? Think about it—you're staring into the consuming face of a nuclear monster. Suddenly everything around you disappears in a blinding flash, yet you don't even suffer a mild sunburn! Sound impossible? Well, Shadrach, Meshach, and Abednego stood safely in the heart of Nebuchadnezzar's fiery furnace because they were secure in Christ (Daniel 3).

This brings me back to the question, "What have we done to prepare people for the inevitable day they will meet God face to face?" Have we lovingly taken the time to offer them the protection they need? This safeguard does not come in the form of lead walls or a radiation suit, though. Nor is it found in some mere religion. The refuge all people need is none other than the righteousness of Christ!

Being infinite God, Jesus is the only acceptable sacrifice for our sins. On the Cross, *He became "ground zero"* for His Heavenly Father's anger against our sin—*the object of God's wrath*. He went willingly to the cross on our behalf so that our sins could be forgiven. Christ alone can make us compatible with His holy Father. But how will people know this unless we tell them (Romans 10:14-15)? I urge, therefore, that we take this charge seriously, for time is short. How else can the lost stand before a holy God (Hebrews 10:31)?

And how will *you* stand? Have you ever been made secure in the eternal love of Christ Jesus? If not, please repent of your sins before the Almighty and receive Christ as your Savior! God will clothe you in the righteousness of Jesus (see Luke 15:11-24). ❑

Because of the LORD's great love we are not consumed, for His compassions never fail (Lamentations 3:22).

HIS CREATION

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